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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,704	09/29/2000	Nagabhushana T. Sindhushayana	PA000419	3513

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EXAMINER	
ABRAHAM, ESAW T	
ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/675,704	SINDHUSHAYANA ET AL.	
	Examiner	Art Unit	
	Esaw T Abraham	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,14-25,27-38 and 40-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,14-20,27-32,35-38 and 40-42* is/are rejected.

7)☒ Claim(s) *8-12, 21-25 and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Final rejection

******Claims 1-12, 14-25 and 27-38 are remained and claims 40-42 (new claims) added.

Response to the applicant's argument

Response to remark pages 9 and 10, the applicant argues that Schulist in view of Wang do not teach delimiting an interval and decoding the segment when the estimated quality metric is outside of the interval. Although, the prior arts (Schulist in view of Wang) do not use the same terms such as "inside or outside of the interval", Wang, however, does teach in figure 4 step 407 a test having a step of comparing the difference D_{cur} to an error threshold if the error bound threshold if in the step 407 determine D_{cur} to be less than the error threshold, the method proceeds to step 404 to terminate decoding and provides the decoded frame of the current iteration as the output data. Further, if the test of step 407 determines D_{cur} is greater than or equal to the error threshold, the method proceeds either i) to step 408 if the MDS test is employed or ii) to step 410 (see col. 7, lines 50-65). Wang, in step 410 further shows that if the maximum number N of iterations has been reached and if step 410 determines that the maximum number N of iterations has been reached, the method proceeds to step 404 to provide the decoded frame of data of either the current iteration, or the iteration having the lowest overall difference value and further if step 410 determines that the maximum number N of iterations has not been reached, the method returns to step 401 for the next iteration (see col. 8, lines 44-53). Therefore, the applicants' arguments although acknowledged, have not been found to be convincing and in light of the above, the rejection is maintained.

DETAILED ACTION

1. Claims **1-12, 14-25 and 27-38 and 40-41** are presented for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims **1-7, 14-20, 27-33 and 35-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schulist et al. (U.S. PN: 6,542,58) in view of Wang (U.S. PN: 6,526,531).

As per claims **1, 14 and 27,** Schulist et al. in figure 3 disclosed an apparatus (receiver) (300) and a method for estimating signal-to-noise rate comprising a turbo decoder (110), SNR (signal to noise rate) adaptation unit (315), a SNR (signal-to-noise) estimator or (SNR processor) (115), a power controller (120) and a reference SNR module (125) (see col. 5, lines 16-33). Schulist et al. teach that SNR (signal quality) value derived from a reference SNR value

generated by the reference SNR module (125) and forwarded to the SNR adaptation unit (315) for modifying the reference SNR based on one or more factors including the scaling factor associated with decoder input quality metrics generated by the demodulation unit (105), coding rate, power settings and processing gains then forwarded to the turbo decoder (see col. 5, last paragraph and col. 6, lines 11-20). Furthermore, Schulist et al. teach that a power control loop capable of generating transmit power control commands connected to the SNR adaptation unit, the SNR adaptation unit receives and modifies the reference SNR value and the turbo decoder (110) connected to the SNR adaptation unit then decodes the received signal as a function of the decode input metrics and the modified reference SNR value (see col. 3, lines 4-15). Schulist et al. did not **explicitly** teach delimiting an interval with accordance the modified quality metric. **However,** Wang in an analogous art teaches an iterative decoder (turbo decoder) having a maximum number of specified iterations but may terminate or limit the number of iterations under specified conditions and early termination (de-limiting) of decoding may occur prior or after an intermediate iteration threshold M (number) of iterations (see abstract). **Therefore,** it would have been obvious to a person having an ordinary skill in the art at the time the invention was made implement the teachings of Schulist et al. using early termination of decoding under specified conditions that may occur prior to iteration threshold number of iterations or after number of iterations occur as taught by Wang. This **modification** would have been obvious because a person having ordinary skill in the art would have been motivated to in order to achieve a reduction in power consumption and an increase in speed of decoding operation. Schulist et al. in view of Wang **do not explicitly teach** a method of dynamically stopping the decoding process. **However,** the decoding process can be iterated as many times as desired,

either using a fixed stopping rule or a dynamic stopping rule, both of which are known to one of ordinary skill in this art, for example; a common fixed stopping rule to perform some maximum number of iterations can perform within the available timeline and a common dynamic stopping rule to continue to iterate until a maximum number of iterations is reached and once the desired number of iterations has been completed it could stop at any time. **Therefore,** it would have been obvious to a person having an ordinary skill in the art at the time the invention was made to employ a process for dynamically stopping the decoding process to heighten the decoding efficiency and increase the flexibility of configuration. **This modification** would have been obvious because a person having ordinary skill in the art would have been motivated because the technique of dynamically stopping the decoding process in the art of iterative decoding systems is conventional and well known.

As per claims **2, 15 and 28,** Schulist et al. in view of Wang teach all the subject matter claimed in claims 1, 14 and 27 including Schulist et al. teach estimating SNR or signal-to-noise-ratio (see abstract).

As per claims **3, 16 and 29,** Schulist et al. in view of Wang teach all the subject matter claimed in claims 1, 14 and 27 including Schulist et al. teach estimating SNR or signal-to-noise-ratio (signal quality) (see abstract). The prior arts (Schulist et al. and Wang) did not **explicitly** teach estimating a signal quality of a slot (segment). **However,** the method of estimating a slot is known in the art because a slot is a portion of a transmission frame that is sent around a loop and commonly practiced by most signal-to-noise ratio (SNR) estimators. **Therefore,** it would have been obvious to a person having an ordinary skill in the art at the time the invention was made to implement a method of estimating a signal quality of a slot in the systems of the prior arts

(Schulist et al. and Wang) since by the fact of virtue estimating a signal quality of a slot according to a specified procedure is commonly used by most of SNR estimators. **This modification** would have been obvious because a person having ordinary skill in the art would have been motivated in order to minimize consumption of space processing power.

As per claims **4, 17 and 30,** Schulist et al. in view of Wang teach all the subject matter claimed in claims 1, 14 and 27 including Schulist et al. in figure 2 teach the expected link performance of a receiver, in terms of a bit error rate (BER) an block error rate (BLER) as a function of SNR (signal quality) estimation used in decoding, the received signal (see col. 5, lines 5-24).

As per claims **5-7, 18-20, 31-33 and 35-38,** Schulist et al. in view of Wang teach all the subject matter claimed in claims 1, 14 and 27 including Schulist et al. teach the SNR adaptation unit (see fig. 3, element 315) employs one of more embedded algorithms to handle the modification of the reference SNR value and these one or more algorithms may be implemented through software, firmware, or a combinations thereof using convolutional tools and programming practices (see col. 6, lines 21-28). Further, Wang teach a turbo decoder (see fig. 3, element 304) decodes the encoded frame with an iterative decoding algorithm including early termination or early de-limiting (see col. 5, last paragraph). Schulist et al. in view of Wang did not **explicitly** teach delimiting a quality signal comprising a parameter defining the formula in accordance to a specific formula. **Nevertheless,** as would have been well known to one ordinary skill in the art at the time the invention was made, parameters are required in most of programs to define a variable that is given constant value for a specified application. **Accordingly,** it

would have been obvious to one ordinary skill in the art to include a parameter in order to name in a procedure that is used to refer to an argument passed to that procedure.

As per claims 40-42, Schulist et al. in view of Wang teach all the subject matter claimed in claims 1, 14 and 27. Schulist et al. in view of Wang **do not explicitly teach** that the quality metric is a slot based. **However,** a time slot is conventional and well known in the art of data communication system because a slot time is the amount of time a device waits after a collision before retransmitting and the transmitting device determines the appropriate amount of slot time by adding the amount of time it took for another device to detect a collision, the amount of time it took for the device to notify the original transmitting device of the collision, and the amount of time it took to transmit a jam sequence. **Therefore,** it would have been obvious at the time the invention was made to one of ordinary skill in the art to employ a process that arranges time slots since that the use of arranging time slots within a data communication system is conventional and well known.

Allowable subject matter

3. Claims **8-12, 21-25 and 34,** are objected to as being dependent upon a rejected base claim but would be allowable if rewritten independent from including all of the limitation of the base claim and any intervening claims. The claimed method wherein decoding the segment comprises delimiting a plurality of interval in accordance with the quality metric threshold; associating each of the plurality of intervals with one of a plurality of parameters; determining an interval from the plurality of intervals into which the estimated quality metric belong and decoding the received signal for a number of iterations equal to the one of a plurality of

parameters associated with the determined interval (as in claims 8, 14 and 34) which the prior art do not teach or render obvious.

Claims **9-12,** which are directly or indirectly dependents of claim 8 are also objected.

Claims **22-25,** which are directly or indirectly dependents of claim 21 are also objected.

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

5. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Esaw Abraham whose telephone number is (703) 305-7743. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are successful, the examiner's supervisor, Albert DeCady can be reached on (703) 305-9595. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for after final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Esaw Abraham

Esaw Abraham

Art unit: 2133

ALBERT DECADY
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